Intensity transformation

Image Arithmetics

You can do some meaningful arithmetics on images to get various results. For examples you can add images,abstract them,or even multiply them.

Now, we are going to test some of these mathematical operations.

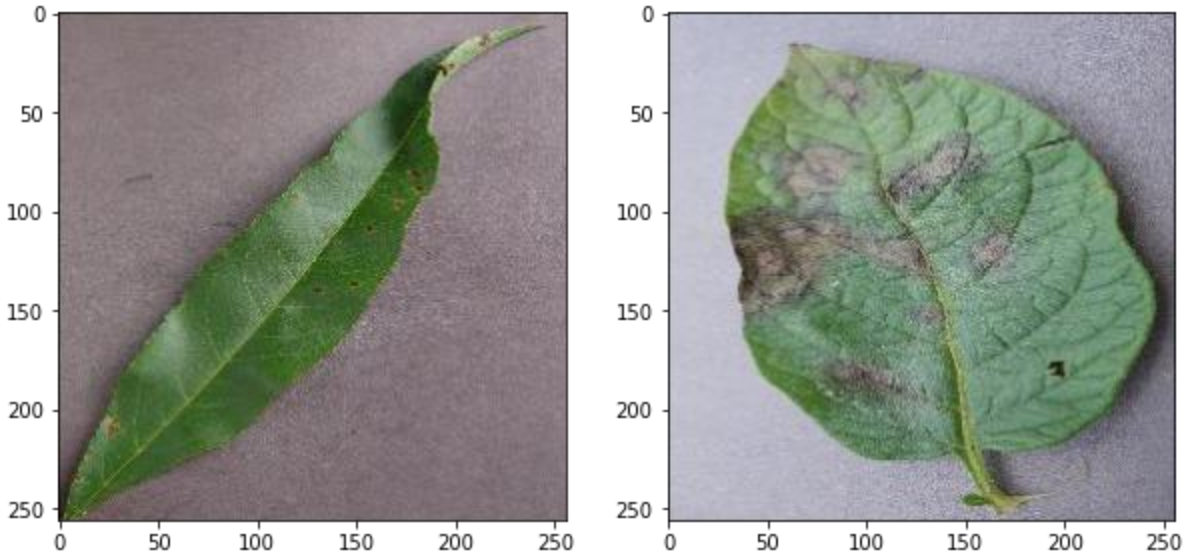
In [1]:

```
from skimage.io import imread
import matplotlib.pyplot as plt
import numpy as np
```

In [4]:

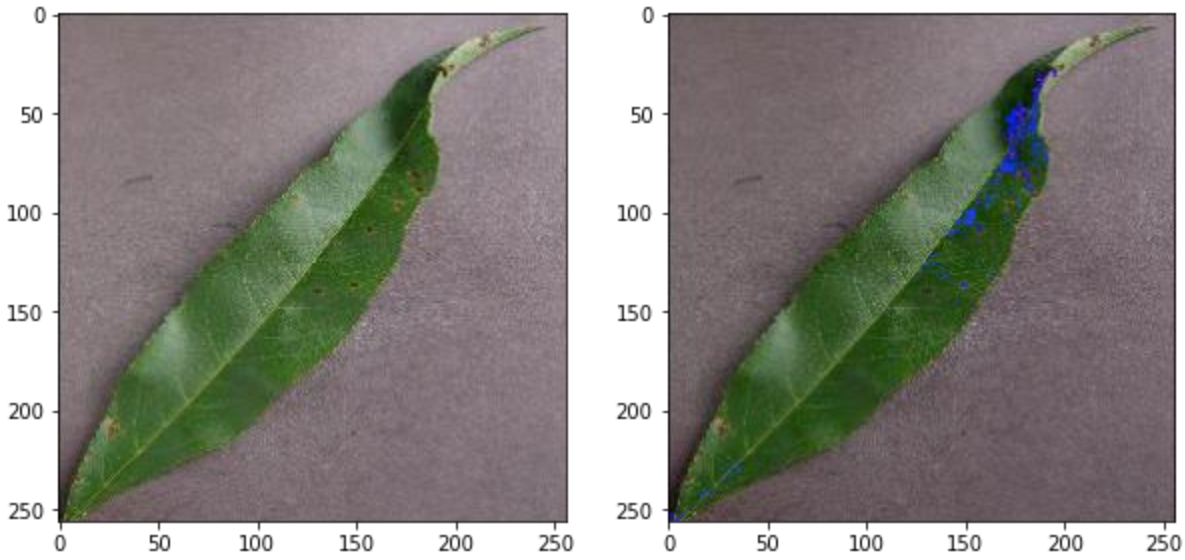
```
live = imread('/content/3fa75f10-79c3-4ffe-9ae4-74a8cf62002c___Rut._Bact.S
1489.JPG')
mask = imread('/content/baac20f4-7978-4258-8cd0-f3f8fe98bf83___RS_LB
4774.JPG')

plt.figure(figsize=(10,10))
plt.subplot(121), plt.imshow(live, cmap='gray')
plt.subplot(122), plt.imshow(mask, cmap='gray')
plt.show
```

Out[4]:



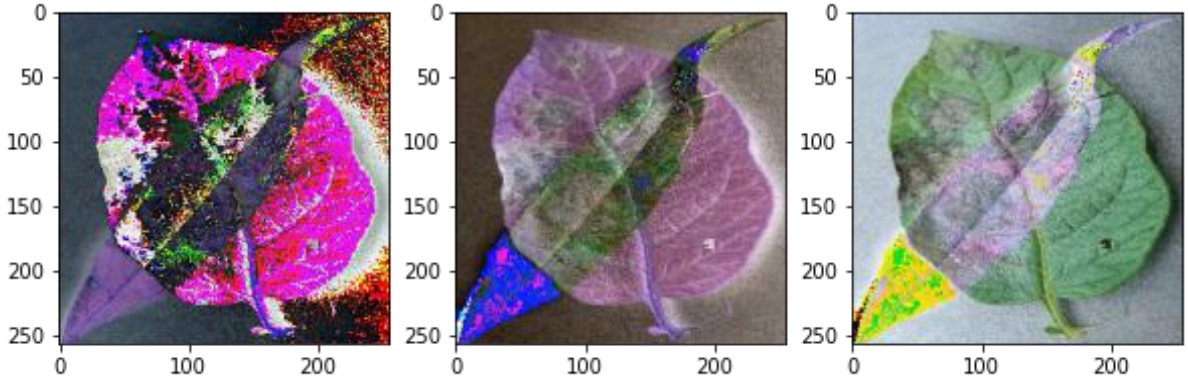
In [6]:

```
plt.figure(figsize=(10, 10))
plt.subplot(121), plt.imshow(live, cmap='gray')
plt.subplot(122),plt.imshow(live-20,cmap='gray')
plt.show()
```



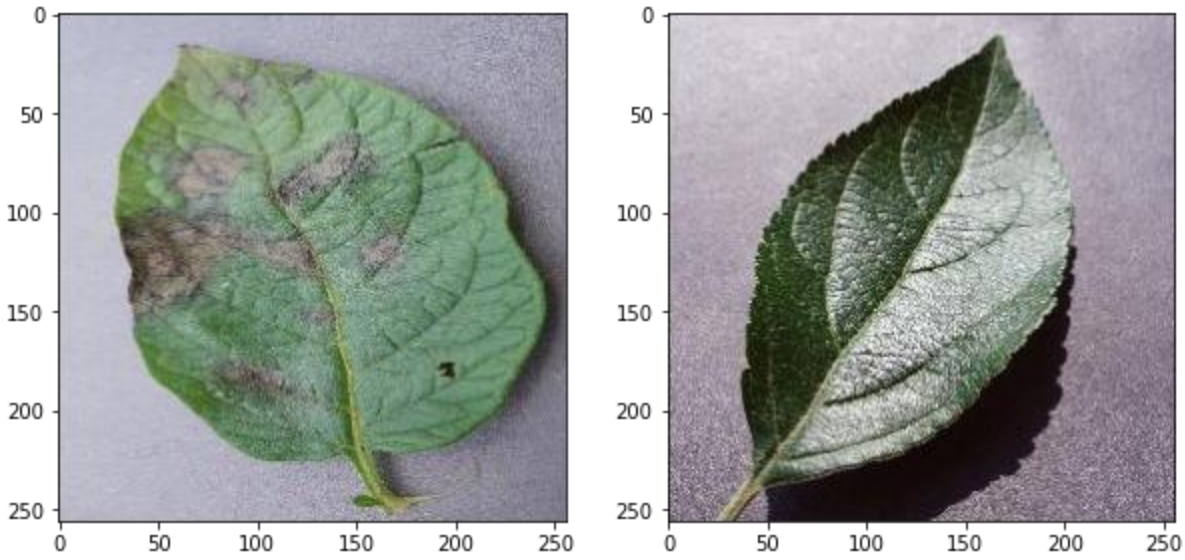
In [7]:

```
plt.figure(figsize=(10,10))
plt.subplot(131), plt.imshow(mask-live, cmap='gray')
plt.subplot(132), plt.imshow(-(mask - live + 128),cmap='gray')
plt.subplot(133),plt.imshow(mask - live + 128, cmap='gray')
plt.show()
```



In [9]:

```
shaded = imread('/content/baac20f4-7978-4258-8cd0-f3f8fe98bf83___RS_LB
4774.JPG')
shading = imread('/content/ff2e08fe-a803-4159-a9ec-0de65dbaad36___RS_HL
7368.JPG')

plt.figure(figsize=(10, 10))
plt.subplot(121), plt.imshow(shaded, cmap='gray')
plt.subplot(122), plt.imshow(shading, cmap='gray')
plt.show()
```

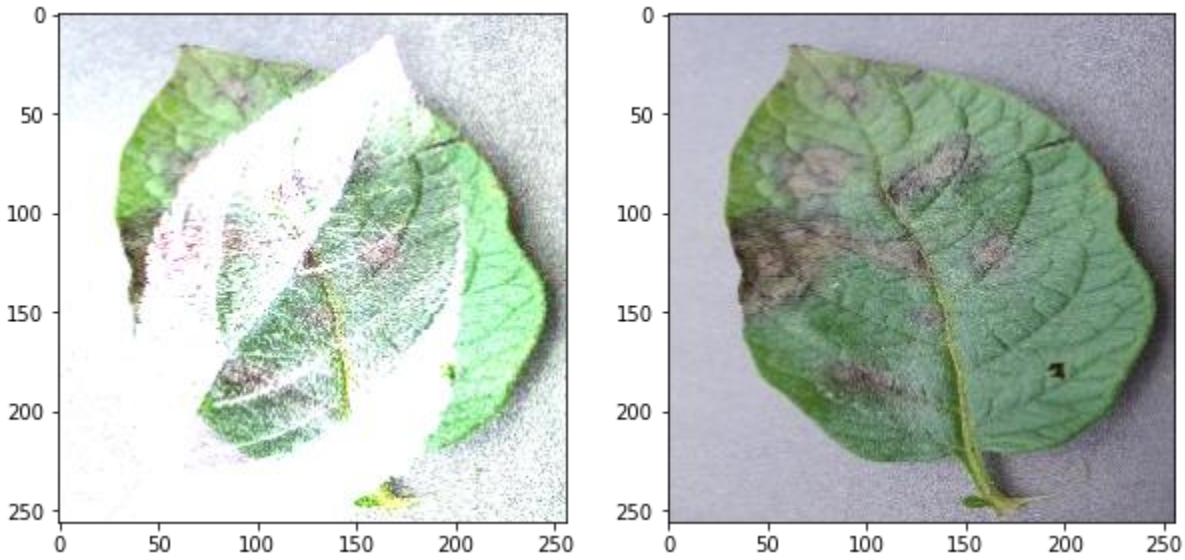


In [10]:

```
plt.figure(figsize=(10,10))
plt.subplot(121), plt.imshow(np.multiply(shaded, 1/shading), cmap='gray')
plt.subplot(122),plt.imshow(shaded, cmap='gray')
plt.show
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:2: RuntimeWarn
ing: divide by zero encountered in true_divide

WARNING:matplotlib.image:Clipping input data to the valid range for imshow
with RGB data ([0..1] for floats or [0..255] for integers).
```

Out[10]:



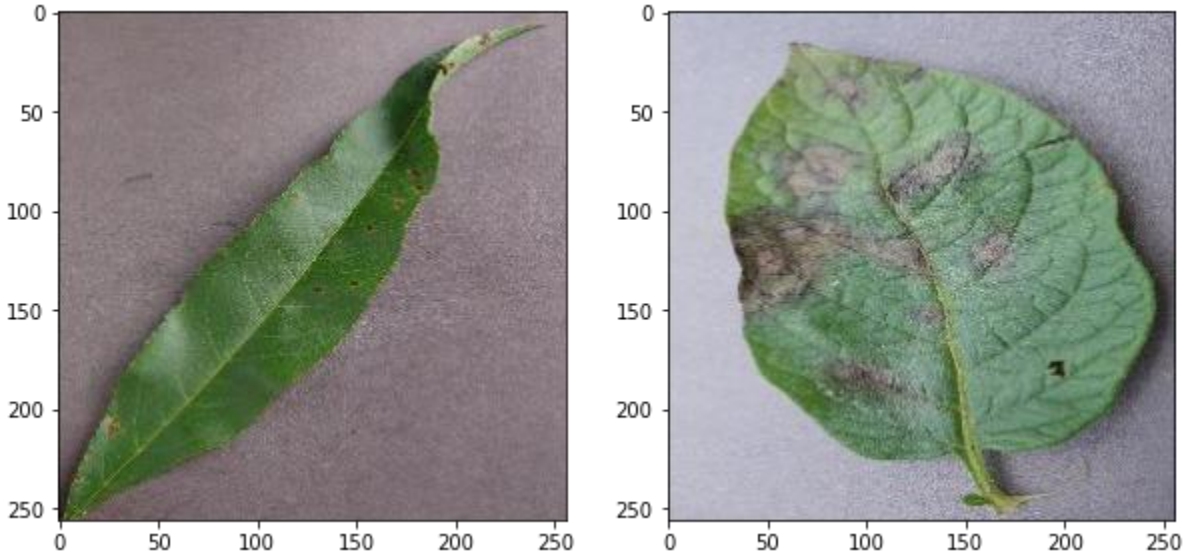
In [14]:

```
# Test on the X-ray dental image
xray = imread('/content/3fa75f10-79c3-4ffe-9ae4-74a8cf62002c___Rut._Bact.S
1489.JPG')
mask_xray = imread('/content/baac20f4-7978-4258-8cd0-f3f8fe98bf83___RS_LB
4774.JPG')
```

In [15]:

```
plt.figure(figsize=(10,10))
plt.subplot(121), plt.imshow(xray, cmap='gray')
```

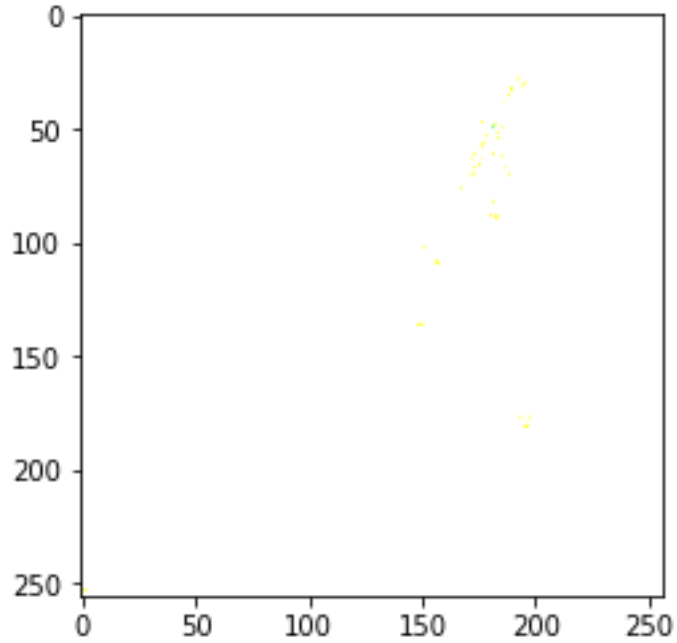
```
plt.subplot(122), plt.imshow(mask_xray, cmap='gray')
plt.show()
```



In [16]:

```
plt.figure()
plt.imshow(np.multiply(xray, mask_xray/255), cmap='gray')
plt.show()
```

```
WARNING:matplotlib.image:Clipping input data to the valid range for imshow
with RGB data ([0..1] for floats or [0..255] for integers).
```



In [19]:

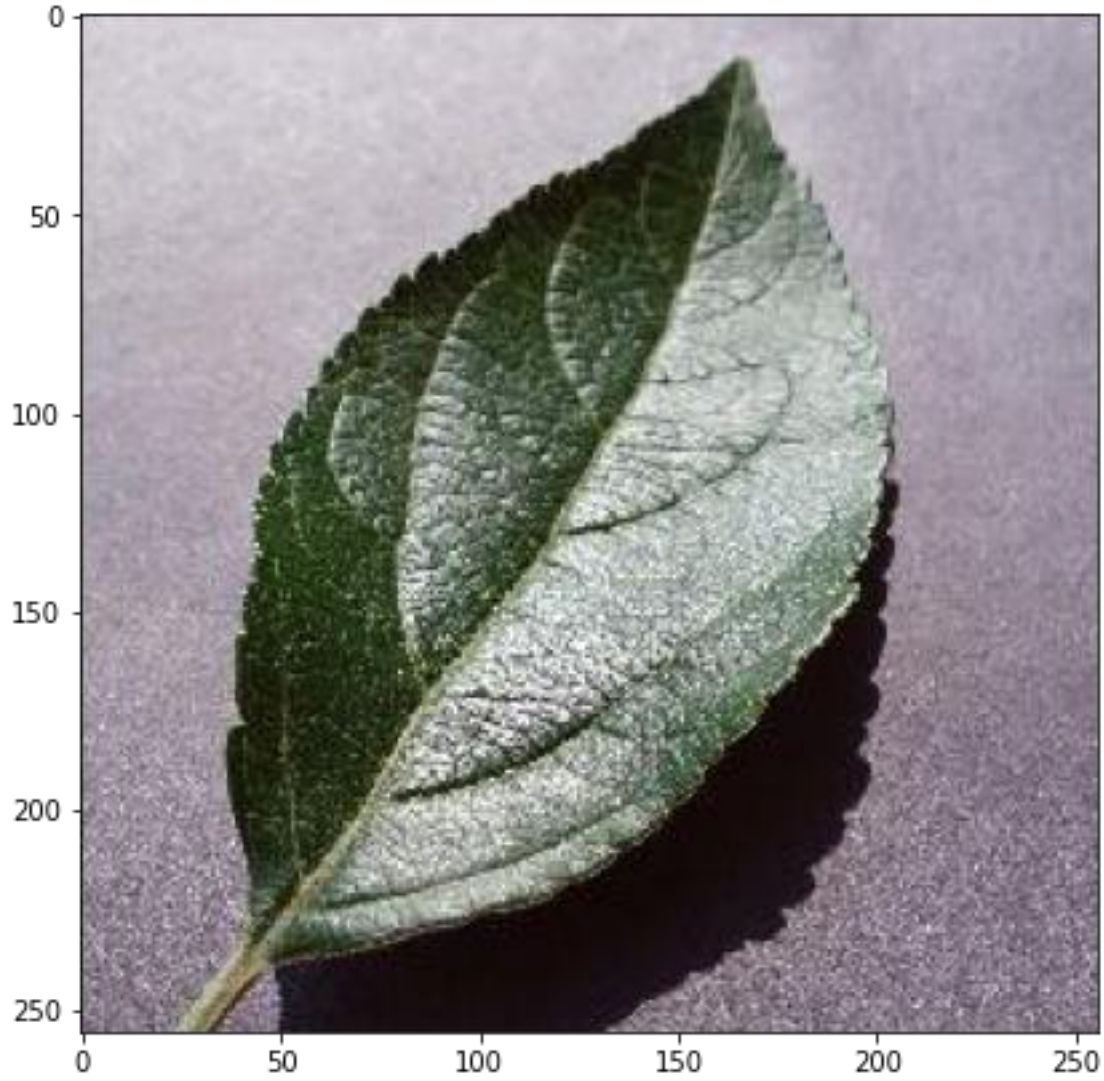
```
# Test on another image
scan = imread('/content/ff2e08fe-a803-4159-a9ec-0de65dbaad36___RS_HL
7368.JPG')
print(scan.shape)
```

```
(256, 256, 3)
```

In [20]:

```
#Showing the body scan image
plt.figure(figsize=(7,7))
```

```
plt.imshow(scan, cmap='gray')
plt.show()
```



Pixel relationships

Usual processes in DIP Pixel (Point) processing

Only individual pixels are entered into a process.The output is dependent on the single pixel values.

Some of this kind of processes are:

Histogram Processing

1. Contrast Enhancement
2. Histogram Equalization
3. Histogram Matching
4. Histogram Syrtching

Intensity Transformations

1.Nagative of an image 2.Log transformation 3.n-th power transformation 4.piecewise transformations

Region (Neighborhood) proceesing

A region(area) of pixels are entered into a process. The output is dependent on the values of entire region.

A common examples of this kind of process includes Spatial Filtering and Morphological Operators,which are:

1. Average filtering
2. Median filtering
3. Sharpening filters
4. Edge detectors
5. Morphological Operations

In [21]:

```
plt.figure(figsize=(10,10))
plt.subplot(211), plt.imshow(xray, cmap='gray')
plt.subplot(212), plt.plot(np.histogram(xray, bins=256)[0])
plt.show()
```